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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,454	05/31/2001	Svend Frolund	10010653-1	3017

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EXAMINER	
MCCARTHY, CHRISTOPHER S	
ART UNIT	**PAPER NUMBER**
2113	

DATE MAILED: 08/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/872,454	FROLUND ET AL.
	Examiner	Art Unit
	Christopher S. McCarthy	2113

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☒ Claim(s) *22-26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Response to Arguments*.

DETAILED ACTION

1. Claims 1-5, and 8-15, and 18-20 are rejected under 35 U.S.C. 102(a) as being anticipated by Moser "Eternal: Fault Tolerance and Live Upgrades for Distributed Object System", as cited in prior office action, which was mailed on 3/25/2004.

2. Claims 6-7, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moser in view of Ma et al. U.S. Patent 6,018,805, as cited in prior office action, which was mailed on 3/25/2004.

3. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moser, "Eternal; fault tolerance and live upgrades for distributed object systems" in view of Moser, "A group communication protocol for CORBA".

4. Claims 22-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-5, and 8-15, and 18-20 are rejected under 35 U.S.C. 102(a) as being anticipated by Moser "Eternal: Fault Tolerance and Live Upgrades for Distributed Object System".

As per claim 1, Moser teaches a hierarchical method for fault tolerance in a distributed computer system (section 2, paragraph 1, lines 1-6): providing a plurality of data centers (section 2, paragraph 3); providing a plurality of objects in each of the plurality of data centers (section 2, paragraph 3); providing a local sub-protocol within each data center; using each local sub-protocol to disseminate messages within its own data center to a plurality of local objects (section 2, paragraph 3; section 6.2.1); and activating each of the local sub-protocols from another data center of the plurality of data centers in a single round-trip message in the absence of faults (section 2, paragraph 5, lines 8-10; section 4, paragraphs 1 and 2). A single round-trip is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action.

As per claim 2, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol (section 2, paragraph 5; section 4, paragraph 2), wherein, the protocol, as taught by Moser, keeps the messages in total order to the objects and is to all the objects. This fulfills the definition of atomic broadcast protocol, as given the disclosure on page 3, paragraph 2, as "messages delivered in the same order to all objects."

As per claim 3, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol (section 2, paragraph 5; section 4,

paragraph 2) and invokes the plurality of objects in the data center (section 6.2.1, paragraph 1, lines 1-4 and paragraph 2, lines 1-6).

As per claim 4, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol and invokes the plurality of objects in other of the plurality of data centers by sending propagation messages; and including: responding to the propagation message in the other of the plurality of data centers activates a local atomic broadcast protocol (section 2, paragraph 6, lines 1-5 and paragraph 5, lines 8-10).

As per claim 5, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol and invokes the plurality of objects in other of the plurality of data centers by sending a propagation message; and including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action.

As per claim 8, Moser teaches the hierarchical method as claimed in claim 1 wherein: activating the local sub-protocol includes using a unique identifier (section 4, paragraph 1).

As per claim 9, Moser teaches the hierarchical method as claimed in claim 1 wherein: providing the plurality of objects includes providing a primary object in one of the plurality of data centers that communicates with the other of the plurality of data centers (section 6.2.1, paragraph 1, lines 1-4).

As per claim 10, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol includes detecting failures within the plurality of objects within each of the plurality of data centers (section 6.3).

As per claim 11, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol includes determining when faults occur in the plurality of objects in a local data center (section 6.3).

As per claim 12, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol includes determining when faults occur in the plurality of objects in a local data center; and including: determining an alternate object in the plurality of objects in the local data center to become a backup primary object when a primary object has a fault (section 6.3).

As per claim 13, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol includes developing a suspicion of the occurrence of faults in the plurality of objects in a local data center; and including: determining an alternate object in the plurality of objects in the local data center to become a backup primary object when a primary object has a fault (section 6.3).

As per claim 14, Moser teaches a hierarchical method for fault tolerance in a distributed computer system (section 2, paragraph 1, lines 1-6): providing a plurality of data centers (section 2, paragraph 3); providing a plurality of objects in each of the plurality of data centers (section 2, paragraph 3); providing a local sub-protocol within each data center; using each local sub-protocol to disseminate messages within its own data center to a plurality of local objects (section 2, paragraph 3; section 6.2.1); and activating a plurality of the local sub-protocols from a

single data center of the plurality of data centers in a single round-trip message in the absence of faults (section 2, paragraph 5, lines 8-10; section 4, paragraphs 1 and 2). A single round-trip is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action.

As per claim 15, Moser teaches the hierarchical method as claimed in claim 14 including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action.

As per claim 18, Moser teaches the hierarchical method as claimed in claim 14 wherein: activating the local sub-protocol includes using the propagation message with a unique identifier (section 4, paragraph 1).

As per claim 19, Moser teaches the hierarchical method as claimed in claim 14 wherein: using the local sub-protocol to determine when faults occur in the plurality of objects in a local data center; and including: determining an alternate object in the plurality of objects in the local data center to become a backup primary object when a primary object has a fault (section 6.3).

As per claim 20, Moser teaches the hierarchical method as claimed in claim 14 wherein: using the local sub-protocol to developing a suspicion of the occurrence faults in the plurality of objects in a local data center; and including: determining an alternate object in the plurality of

objects in the local data center to become a backup primary object when a primary object has a fault (section 6.3).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 6-7, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moser in view of Ma et al. U.S. Patent 6,018,805.

As per claim 6, Moser teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol and invokes the plurality of objects in other of the plurality of data centers by sending a propagation message; and including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action. However, Moser does not teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time. Ma does teach waiting a time for the acknowledgement and sending a second propagation message to another of the

plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time (column 5, lines 32-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the message process of Ma in the fault tolerance system of Moser. One of ordinary skill in the art would have been motivated to utilize the message process of Ma in the fault tolerance system of Moser because the process of Ma of failing over to a different server object with the same replicated data allows for quicker recovery of the data to the user, a need explicitly desired by Moser (section 1, paragraph 1, lines 7-12).

As per claim 7, Moser teaches teaches the hierarchical method as claimed in claim 1 wherein: using the local sub-protocol uses an atomic broadcast protocol and invokes the plurality of objects in other of the plurality of data centers by sending a propagation message; and including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action. However, Moser does not teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time. Ma does teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time (column 5, lines 32-50). It would have been obvious to one of ordinary

skill in the art at the time the invention was made to utilize the message process of Ma in the fault tolerance system of Moser. One of ordinary skill in the art would have been motivated to utilize the message process of Ma in the fault tolerance system of Moser because the process of Ma of failing over to a different server object with the same replicated data allows for quicker recovery of the data to the user, a need explicitly desired by Moser (section 1, paragraph 1, lines 7-12). Although Moser does not explicitly describe sending the first and second propagation messages includes sending first and second unique identifiers; Moser does teach "Each object group has a unique object group identifier" (section 4, paragraph 1, lines 4-5). Therefore, when the message process of Ma is utilized in the system of Moser, it is inherent that the different connections, as used by Ma, would consist of different unique identifiers according to the group identifiers of Moser.

As per claim 16, Moser teaches the hierarchical method as claimed in claim 14 including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action. However, Moser does not teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time. Ma does teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not

received within the time (column 5, lines 32-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the message process of Ma in the fault tolerance system of Moser. One of ordinary skill in the art would have been motivated to utilize the message process of Ma in the fault tolerance system of Moser because the process of Ma of failing over to a different server object with the same replicated data allows for quicker recovery of the data to the user, a need explicitly desired by Moser (section 1, paragraph 1, lines 7-12).

As per claim 17, Moser teaches the hierarchical method as claimed in claim 14 including: responding to the propagation message in the other of the plurality of data centers includes providing an acknowledgement to the data center in the plurality of data centers from one of the plurality of objects therein (section 2, paragraph 5, lines 8-10). An acknowledgment is inherent in the FTMP protocol cited by Moser. For further explanation of this protocol, please refer to Moser "A Group Communications Protocol for CORBA" as included in the PTO-892 of this action. However, Moser does not teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time. Ma does teach waiting a time for the acknowledgement and sending a second propagation message to another of the plurality of objects in the other of the plurality of data centers if the acknowledgement is not received within the time (column 5, lines 32-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the message process of Ma in the fault tolerance system of Moser. One of ordinary skill in the art would have been motivated to utilize the message process of Ma in the fault tolerance system of Moser because the process of

Ma of failing over to a different server object with the same replicated data allows for quicker recovery of the data to the user, a need explicitly desired by Moser (section 1, paragraph 1, lines 7-12). Although Moser does not explicitly describe sending the first and second propagation messages includes sending first and second unique identifiers; Moser does teach "Each object group has a unique object group identifier" (section 4, paragraph 1, lines 4-5). Therefore, when the message process of Ma is utilized in the system of Moser, it is inherent that the different connections, as used by Ma, would consist of different unique identifiers according to the group identifiers of Moser.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moser, "Eternal; fault tolerance and live upgrades for distributed object systems" (referred to hereafter as Moser1 in view of Moser, "A group communication protocol for CORBA" (referred to hereafter as Moser2.

As per claim 21, Moser1 teaches a method, comprising: generating, by a first object in a first data center, a request to invoke other objects in a plurality of other data centers, relaying a message from the first data center to a receiver object in each of the plurality of data centers (section 4, paragraphs 1 and 2); activating, by the receiver object in each of the plurality of data centers, a broadcast protocol to disseminate the message locally to a plurality of objects within each of the plurality of data centers (section 6.2.1). Moser1 does not explicitly teach the limitations of waiting, by the first data center, for an acknowledgement message from each of the plurality of data centers to acknowledge receipt of the message, failing to receive, by the first data center, an acknowledgement message from one of the data centers; and resending the

message from the first data center to a second receiver object in the one of the data centers after failing to receive, by the first data center, the acknowledgement message from the one of the data centers. However, Moser1 does incorporate Moser2, which explicitly details the FTMP protocol as utilized in the invention of Moser1, and Moser2 teaches the limitations in section 2. One of ordinary skill in the art at the time the invention was made would have utilized the protocol of Moser2 in the communication process of Moser1. One of ordinary skill in the art would have been motivated to utilize the protocol of Moser2 in the communication process of Moser1 because Moser1 explicitly teaches, in section 2 paragraph 5, the suggested use of the FTMP protocol as a possible protocol to be used in the Moser1 invention. Moser2 then teaches the use of acknowledgments and the absence thereof in the FTMP protocol and also the resending of messages when an acknowledgment is not received. Since Moser1 teaches the use of FTMP protocols and Moser2 teaches the given definitions of FTMP, the invention of Moser1 would obviously incorporate the given definition of FTMP into its invention.

Allowable Subject Matter

10. Claims 22-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments filed 6/24/2004 have been fully considered but they are not persuasive.

With respect to claim 1, the applicant argues that Moser does not teach using each local sub-protocol to disseminate messages within its own data center; and activating each of the local sub-protocols, as newly amended to the claim. The examiner respectfully disagrees. Moser states in section 6.2.1, in the last four lines of the first paragraph, that multicast protocol of the group ensures that all of the non-primary replicas have been updated by the primary, or none of them are updated. The primary is using a local sub-protocol to update the replicas within its own data center and this fulfills the amended and argued limitation. Therefore, all applicable rejected claims stand.

Furthermore, the applicant argues that Moser does not teach which aspects of FTMP protocol, which was currently being developed, would be utilized in the Eternal system of Moser. The applicant also argues that FTMP does not inherently teach a single round trip message in the absence of faults. The examiner respectfully disagrees and wishes to clarify the rejection. In the Moser reference of "Eternal: fault tolerance and live upgrades for distributed object system", it disclosed, as argued before, that FTMP is a multicast group protocol and was currently being developed, as correctly stated by the applicant. However, Moser does make reference to the article of "A group communication protocol for CORBA". This article is pertinent due to incorporation by reference by the prior Moser reference. Although the prior Moser reference does state that the FTMP was currently being developed at the time of the "Eternal" reference publication, the FTMP reference of Moser was published prior to the "Eternal" reference. Single round trip messaging is further elaborated on in the secondary reference of Moser. In sections 2 and 4, Moser teaches wherein each message is sent from an invoker to a destination and each message has an ACK, which implies that a round trip is

expected; otherwise, no ACK would be missed or expected. In summary, each message to the destination is expected to send back a reply packet. If one is not returned, the sender knows the message has come across an error. If a reply is returned, then the round trip is completed in the absence of faults. This communication protocol fulfills the argued limitation and, therefore, the rejection stands.

With respect to claim 6, the applicant argues that the propagation message is sent to another object in the same data center. However, the claim language cites "to another of the plurality of objects in the other of plurality of data centers." The argument differs from the claim language. If the applicant wishes to argue "another object in the same data center," then this needs to be in claim language. Therefore, the rejection stands.

With respect to claim 14, the applicant argues that Moser does not teach activating a plurality of the local sub-protocols from a single data center. The examiner respectfully disagrees. The examiner directs the applicant to the arguments above concerning the sub-protocols that are activated in each respective group. As for the amended and highlighted argument of activating from a single data center, the examiner directs the applicant to the Moser reference in section 4, paragraph 1 and 2, wherein Moser teaches the communication between the client object and server objects using a multicast protocol. Therefore, a single data center (client) invokes multiple object groups (server objects), wherein each server object activates the sub-protocol of its own group, as argued above. Therefore, the rejection stands.

Conclusion

12. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher S. McCarthy whose telephone number is (703)305-7599. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on (703)305-9713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

csm
August 16, 2004

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